ORIGINAL ARTICLE

CLINICAL OUTCOME OF DENGUE FEVER AMONG PATIENTS ADMITTED IN TERTIARY CARE HOSPITAL OF PESHAWAR

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ABSTRACT

Objective: To determine the clinical outcome of dengue fever among patients presenting to tertiary care hospital.

Material and Methods: This study was carried out in Department of Medicine, unit A, Khyber Teaching Hospital Peshawar - Pakistan from July, 2017 to December, 2017. After taking ethical approval and subsequent informed consent, a total of 200 patients admitted with dengue fever were recruited in the study using convenience purposive sampling technique. Patients of either gender, aged between 11 and 80 years were included. A record of blood counts, transfusion requirements and any complications developed during hospital stay was made from the day of admission till the day of discharge. The results were analyzed in Microsoft Excel 2017 and tabulated. Frequencies and percentages were calculated for the categorical variables like gender, age groups, blood counts, dengue serology, NS1 antigen status, major and minor bleeding diatheses, number of blood transfusions and number of deaths.

Results: Out of 200 patients who were admitted to the medical unit, 136 (68%) were females and 64 (32%) were males. 53 (26.5%) patients were aged between 11-20 years; 60 (30%) patients were aged between 21-30 years; 33 (16.5%) patients were aged between 31-40 years; 15 (7.5%) patients were aged between 41-50 years; 31 (15.5%) patients were aged between 51-60 years; 6 (3%) patients were aged between 61-70 years, and 2 (1%) patients were in the age group of 71-80 years. 111 (55.5%) had positive dengue serology, while 89 (44.5%) had negative serology. All 200 patients had positive NS1 Antigen status. On admission, 86 (43%) of the patients had platelet counts < 50,000/cm3. At the time of discharge, only 11 (5.5%) patients had platelet counts < 50,000/cmm.72 (36%) patients experienced minor bleeding diatheses in the form of nose bleeds, gum bleeding, petechial hemorrhages, blood in saliva etc. Only 2 (1%) patients developed major bleeding diatheses in the form of per rectal fresh bleeding, hematuria or intra-cranial bleed. Eight (4%) patients went into dengue shock syndrome, as evident from a blood pressure less than 80/60mmHg. Twenty two (11%) patients received between 1-3 platelet transfusions; 46 (23%) patients received between 4-6 platelet transfusions, while 3 (1.5%) patients received between 7-9 platelet transfusions.Death was recorded in 2 (1%) patients with dengue fever.

Conclusion: Dengue fever is associated with a relatively good clinical outcomein patients admitted to tertiary care hospital and is associated with serious complications in only a small subset of patients.

Key Words: Dengue fever; transfusion; dengue serology; NS1 antigen; platelet counts.

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INTRODUCTION

Dengue haemorrhagic fever has emerged as an important clinical entity in Pakistan over the last few years after its epidemic outbreaks in different parts of the country. The disease is spread by Dengue virus which is a Flavi virus transmitted through the bite of Aedes aegypti mosquito[1,2]. The virus has four serotypes. Infection from a particular serotype confers lifelong immunity against that particular serotype; however infection from other serotypes can still occur[3]. Symptoms of dengue fever begin to develop between 4 to 7 days after mosquito bite (hence the incubation period), and persist for 3 to 10 days. A mosquito can contract the virus from an ill person when there are enough viruses present within the circulation. After the blood meal, a mosquito requires nearly 8 to 12 days before it can transmit the virus to another person, thereby completing the cycle[4-6].

Mosquitoes breed in standing water therefore all such factors promoting poor disposal of water supplies

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promote dengue infection[7]. A steep rise has been noticed in the incidence of dengue infection during and after rainfalls a possible reason could be the inadequate disposal of rain water. The mosquitoes get a reservoir for breeding and hence promote transmission of dengue infection. Other modes of water reservoirs especially those left uncoveredeg. water storage tanks and water coolers are also an important source of infection. The apparently least important of all for example plant pots can also act as a breeding source for the mosquitoes[8,9]. Dengue fever presents with high grade fever, retro-orbital pain, sore throat, nausea, vomiting, centrifugal maculopapular rash and generalied body aches and pains. The pains are so severe that the term break bone fever has been coined for the expression of severity of pain in this condition[10]. Dengue fever can complicate into dengue haemorrhagic fever if an already infected patient experiences a second bite from another serotype of dengue[11]. If dengue haemorrhagic fever further complicates, it can lead to dengue shock syndrome which is a potentially fatal condition occurring due to extravasation of plasma fluid into interstitial fluid[12].

Over the past few decades, dengue fever has emerged with a different perspective. Globalization, international and inter-city travel, refugee migration, poor water quality, improper waste disposal and inadequate vaccination programs have all led to spikes in dengue epidemics especially after the monsoon season. All 4 dengue serotypes are endemic in Pakistan[13-15].

The current study aims to explain the clinical outcome of dengue fever among patients admitted in Department of Medicine, Khyber Teaching Hospital, Peshawar. It intends to highlight the clinical presentation of such patients, trends in their serial blood counts, and whether the patients developed any complications.

MATERIAL AND METHODS

This descriptive cross sectional study was carried out in Department of Medicine, unit A, Khyber Teaching Hospital,Peshawar-Pakistan from July, 2017 to December, 2017. Ethical approval was taken from the hospital ethical committee. A total of 200 patients admitted with dengue fever were recruited in the study after an informed, written consent form was filled by the patients or their designated family members. Convenience purposive sampling technique was used to collect samples. Only admitted patients with NS1 Ag positivity or positive dengue serology were recruited in the study; outpatients with dengue fever were not included in the study because they could not be followed on subsequent visits. Patients were admitted on the basis of either very low platelet counts (<50,000/cmm), low blood pressure readings (<90/60mmHg), minor or major bleeding diathesis or dengue NS1 positivity in the background of some other chronic condition e.g. diabetes, hypertension, pregnancy etc. Patients were stratified according to gender and age. Their initial blood counts on presentation were noted and daily blood counts were done till the 5th day of admission. A record of transfusions was also made; platelet transfusions and whole blood transfusions were stratified according to patients' blood counts. Note was also made of patients developing complications in the form of minor bleeding diatheses, major bleeding diatheses, dengue shock syndrome and deaths.

The results were analyzed in Microsoft Excel 2017 and tabulated. Frequencies and percentages were calculated for the categorical variables like gender, age groups, blood counts, dengue serology, NS1 antigen status, major and minor bleeding diatheses, number of blood transfusions and number of deaths.

RESULTS

Results of the current study revealed that out of 200 patients who were admitted to the medical unit, 136 (68%) were females and 64 (32%) were males. 53 (26.5%) patients were aged between 11-20 years; 60 (30%) patients were aged between 21-30 years; 33 (16.5%) patients were aged between 31-40 years; 15 (7.5%) patients were aged between 41-50 years; 31 (15.5%) patients were aged between 51-60 years; 6 (3%) patients were aged between 61-70 years, and 2 (1%) patients were in the age group of 71-80 years. Majority of the patients that were infected with dengue virus infection were in the age range of 21-30 years.

The trends of platelet counts over 4 consecutive days from the time of presentation, and then on the day of discharge are depicted in the graph below (Figure 1). At the time of presentation, 86 (43%) of the patients had platelet counts < 50,000/cmm. At the time of discharge, only 11 (5.5%) patients had platelet counts < 50,000/cmm. All these 11 patients had stable vitals (BP >90/60mmHg, <140/90mmHg; pulse >60/min, <100/min; temp. = 99-F at the axilla) with no active bleeding.

The trend of total leucocyte count (TLC) of the 200 patients at the time of presentation is outlined in Figure 2.

11 (5.50%) patients had hematocrit between 26-30%; 34 (17%) patients had hematocrit between 31-35%; 48 (24%) patients had hematocrit between 36-40%; 78 (39%) patients had hematocrit between 41-45%; 18 (9%) patients had hematocrit between 46-50%; 8 (4%) patients had hematocrit between 51-55%, while 3 (1.5%) patients had hematocrit between 56-60%.

Details of major and minor (nose bleeds, gum bleeds, blood in saliva, petechial hemorrhages etc) bleeding di-

atheses, dengue shock syndrome (DSS) and mortalities are given in table 2. Of the 2 patients that developed major bleeding diathesis, one had fresh per-rectal bleeding and hematuria, while the other patient sustained intra-cranial bleeding. 8 (4%) patients went into dengue shock syndrome, as evident from a blood pressure less than 80/60mmHg. Not all these patients had profuse bleeds, but they did show evidence of a rising hematocrit leading from circulatory collapse. 22 (11%) patients received between 1-3 platelet transfusions; 46 (23%) patients received between 4-6 platelet transfusions, while 3 (1.5%) patients received between 7-9 platelet transfusions of all the 200 admitted patients, 2 (1%) patients with dengue fever expired.

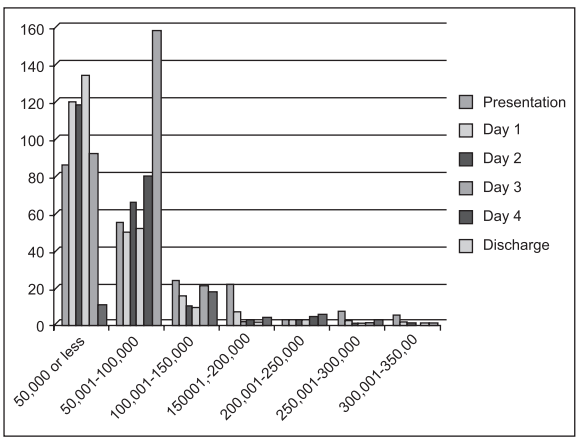

Fig 1: Daily platelet count variation among patients

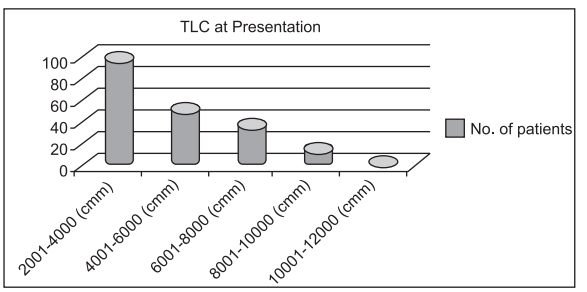

Fig 2: Total Leucocyte Count at presentation

DISCUSSION

The current study outlines the clinical outcome of dengue fever in 200 patients admitted to department of Medicine (unit A) in the second half of 2017. Peshawar faced a serious epidemic of dengue in 2017. A multitude of patients belonging to Peshawar and the sub-urban villages surrounding Peshawar suffered from Dengue fever. Multiple members of the same family were inflicted with the infection. The first outbreak of dengue fever occurred in Pakistan in 1994[16]. However, it first took the form of an epidemic in 2005 in Karachi[17]. Since then, it has caused multiple morbidities and even deaths in Khyber Pakhtunkhwa, Punjab and Sindh provinces. The flood of 2010 in Pakistan worsened the condition and provided a major breeding ground for the mosquitoes[18-19].

As is evident from our study findings, male and female patients of all ages were infected. Not all of them had positive dengue serology, but the NS1 antigen was positive in all patients, so our investigation of choice for suspected patients was NS1 antigen instead of dengue serology. Patients with positive NS1 antigen had serology tested in hospital, and if not available, then tested from private laboratories on patients' expenses or if not affording, then from ward funds. Other modes for the detection of dengue infection are dengue virus E and M-protein specific IgM/IgG ratio especially for detection of secondary infection,[20] plaque reduction neutralization techniques (PRNT) for vaccine and research purposes,[21] and different types of nucleic acid amplification tests like real time polymerase chain reaction (RT-PCR) for quantification of the virus within 1.5 hours[22]. Majority of admitted patients were in the age range 21-30 years. This is consistent with findings from other studies[23,24].

Majority of the patients had stable platelet counts at the time of admission. Platelet counts less than 150,000/cmm were seen in a similar study conducted in Karachi[25]. Similarly Mumtaz K et al reported thrombocytopenia in 83% of the study subjects[26]. Throm-

Table 1: Dengue Serology and NS1 Status

Status	NS1 number (n1)	% of NS1	Dengue Serology number (n2)	% of Dengue Serology
Positive	200	100.00%	111	55.50%
Negative	0	0.00%	89	44.50%

Table 2: DSS status, Mortality status, Major Diathesis, Minor diathesis

Status	DSS status (n1)	% of DSS	Mortality Status (n2)	% of Mortality	Major Diathesis(n3)	% of Major Diathesis	Minor Diathesis (n4)	% of Minor Diathesis
Yes	8	4.00%	2	1.00%	2	1.00%	72	36.00%
No	192	96.00%	198	99.00%	198	99.00%	128	64.00%

bocytopenia occurs in dengue fever secondary to bone marrow suppression, direct effect of the virus on platelets, and circulating antibodies against platelets[27-29]. Coagulopathy is another commonly reported finding in patients with dengue fever, however in our study none of the patients had prolongation of APTT. Complete blood counts were carried out daily and the trend of platelet counts and hematocrit was monitored. 8 (4%) patients developed dengue shock syndrome and they were infused dextran 40 colloid infusion to prevent third space fluid sequestration.

Death was recorded in 2 (1%) patients admitted with dengue fever. One of them was diabetic, asthmatic and on nebulizations, antibiotic and corticosteroid therapy. She developed type 2 respiratory failure and could not survive. The second patient, also a female was hypertensive with poorly controlled blood pressure readings. She developed intra-cranial bleed which she could not sustain. Both these patients had multiple co-morbids. Both had platelet counts greater than 30,000/cmm at the time of deterioration. It is therefore difficult to conclude whether the deaths occurred from dengue infection or the concomitant co-morbids.

CONCLUSION

Dengue fever is associated with morbidity due to fever, body aches, thrombocytopenia and low blood pressure due to 3rd space fluid sequestration in majority of the patients. However, mortality from dengue fever was seen in very few patients. It has good clinical outcome in a great proportion of patients without the need for platelet or blood transfusions.

RECOMMENDATIONS

There is a dire need to conduct further research regarding different aspects of dengue fever eg: genotype and serotype analysis, vector control, calculation of larval indices, reasons behind major breakthroughs, causes of recurrent attacks of dengue fever etc. Further insight into the genetics of the disease might help eradicating or at least bringing a hault to the infection.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

Badshah A: Main idea, data collection, formatting of article, discussion writing.

Subhan S: Data collection and data compilation.

Mohammad W: Literature search.

Khan ZU: Literature Search.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.